

Supply Chain Management Drivers and Public Policy of Private Partnership in Indonesian Higher Education Sector

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Abstract---Now a day, supply chain management (SCM) is becoming increasingly important. SCM practices have been emerged up to a great extent. However, a significant part of literature is still missing on SCM in services sector. A scarce number of research studies were focused on SCM in the academia. In rare cases any study formally documented the role of public policy for private partnership on SCM in educational institutions, particularly in Indonesia. Thus, the prime objective of this study is to investigate the role of education suppliers and research suppliers to boost up SCM in Indonesia with moderating role of public policy for private partnership. To achieve this objective, the current study used quantitative approach. Survey method used to collect the data. Data were collected from employees of Indonesian universities. Three hundred (300) questionnaires were distributed among the respondents. After analysing the data through Smart PLS 3, it was found that education suppliers and research suppliers have significant influence on SCM through universities management. Moreover, it was investigated that public policy for private partnership has moderating role between university management and SCM. Public policy for private partnership significantly enhance the positive effect of education suppliers and research suppliers on SCM. Thus, the current study contributed by investigating the mediating role of university management and moderating role of public policy for private partnership. Finally, this study investigated the major derives of SCM in educational sectors, namely; education suppliers, research suppliers, university management and public policy for private partnership.

Keywords---Supply chain management, education suppliers, research suppliers, university management, public policy, private partnership.

1. Introduction

Now a day, supply chain management (SCM), analysis, and development are becoming increasingly important [1]. SCM is required for various reasons such as improving operations, outsourcing, profits maximization, to enhance satisfaction, quality in outcomes, increasing globalization, to gain competitive edge etc. [2]. However, SCM in educational institutions particularly in universities is now increasing day by day. In universities, SCM generally based on the supplier of education, supplier of research with positive collaboration of higher educational institutions like universities.

SCM had been implemented from the different logistics concept [3] [4] as this concept is described by various latest studies [5] [1] [6]. Subsequently, it has been functional effectively in different industries to acquire stakeholder's satisfaction in supply chain. Several research studies on SCM are available on different manufacturing industries [7] [8] [9] [10]. Few studies, carried out research on services industries [11] [12] [35] [36] [37] [2]. Especially in Indonesia, a limited number of studies formally documented the SCM practices in service sectors.

A scarce number of research studies were focused on SCM in the academia [13], particularly in Indonesian context. Various studies currently carried out research on

educational SCM [14] [13] [15], however, in rare cases any study formally documented the role of private partnership in educational SCM. Therefore, the present study filled this literature gap by incorporating private partnership policy as a moderating variable between universities and supply chain management.

Moreover, very few articles tried to develop suitable models for educational SCM. [16] developed an educational supply chain as an instrument for strategic planning in the field of education. After that various researches provide different model on the SCM in educational institutes. A recent study by [17] documented the supply chain model in the educational sector of Indonesia. The author highlighted the University of Al Azhar Indonesia (UAI) and found that SCM is most crucial in educational institutions of Indonesia. Most

of the universities as well as practitioners tried to apply these models to carry out SCM practise in educational institutions, however, few practitioners were failed to do so. [18] developed a model on education supply chain, model is given in Figure 1 below. According to this model students are the major input of supply chain in educational institutions. These students are categorized into undergraduate students, master students and PhD students. However, the university is the main element in this supply chain. Universities provides learning opportunities, teaching opportunities, research opportunities as well as different administrative opportunities. All this process brings something new in the shape of output which is helpful in SCM activities in education sector.

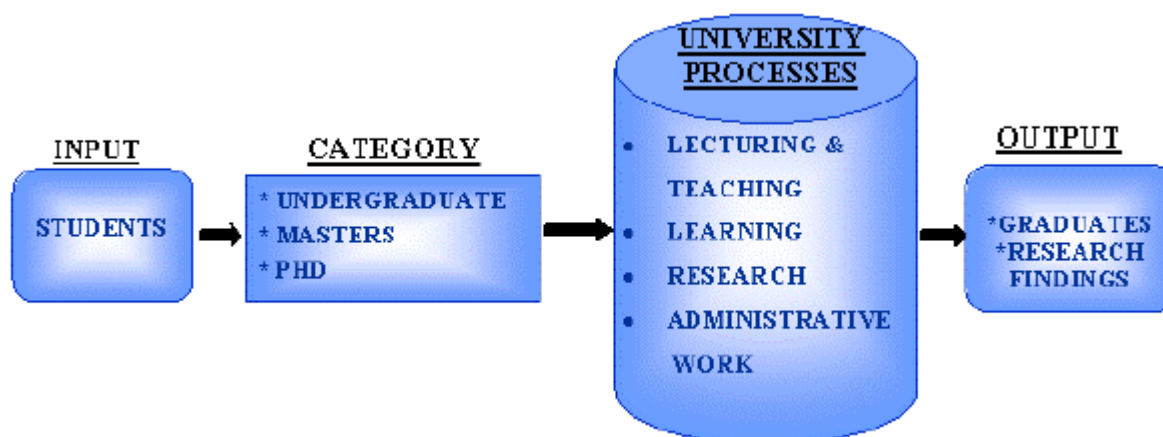


Figure 1. Educational Supply chain management model

Source: [18]

However, in all this process, education supplier as well as research suppliers are most significant element. These two elements integrate with each other and build a good SCM with the help of universities. Apart from education supplier and research suppliers, public policy of private partnership is most influencing factor to develop good SCM. Thus, the current study using public policy of private partnership as a moderating variable between universities and SCM. Moreover,

universities are taken a mediating variable to enhance the effect of education supplier and research suppliers on SCM in educational sector.

Thus, the prime objective of this study is to investigate the role of education suppliers and research suppliers to boost up SCM in Indonesia. Moreover, the study also examined the mediating role of universities and the moderating role of

public policy in private partnership. Hence, the sub-objectives are as follow;

1. To investigate the mediating role of universities between the relationship of education suppliers
2. To investigate the moderating role of public policy of private partnership between universities and SCM in Indonesian educational sectors.

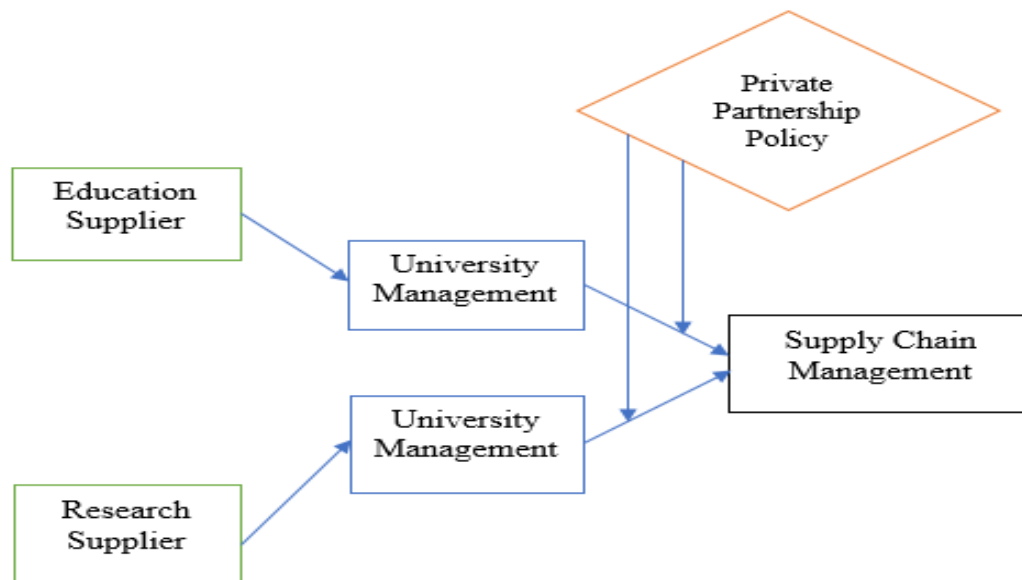


Figure 2. Theoretical Framework

2. Review of Literature and Hypothesis Development

Supply chain is one of the set of organizations majorly linked by more than one of the upstream as well as downstream flows of products, different services, finances, other related materials and information from a source to a customer. However, management of the supply chain denoted to as 'Supply Chain Management' (SCM) [19].

An integrated educational supply chain comprised of coordination as well as information sharing. With technology facilitating information flow, a coordinated supply chain can be planned to meet the strategic and operational purposes of the various educational institutions. It also

indicates that establishing good relationships both inside as well as outside the organization [20] [47] [48].

The current study majorly introduced two main drives of SCM in educational sector of Indonesian. These drivers are education supplier and research supplier. These suppliers are majorly based on students of universities. As the academic institutions are the generally full of talent. Here the university management has key role to develop their students in such a way to generate well management supply chain activities. In the proposed model, the study introduced two major section in the suppliers, namely; education suppliers and other one is research suppliers for the universities. Both these suppliers are shown in Figure 2.

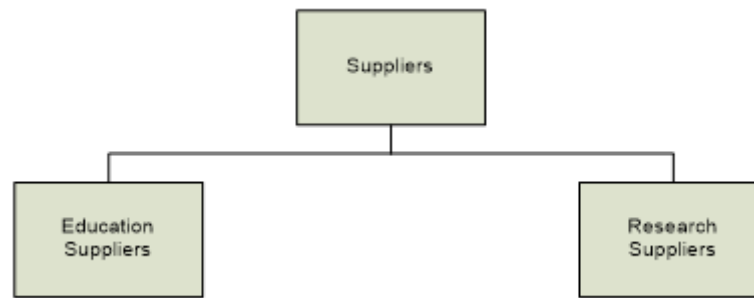


Figure 3. Supplier Integration

Education suppliers comprised of student from high school/college, suppliers of the faculty including other universities, self-funding students, family such as parents and siblings, relatives, etc. Moreover, the government and private organizations who provides the scholarship also include in suppliers. On the other hand, research suppliers include suppliers of research projects like university self-funding, suppliers of external research projects such as external research funds, ministry of education as well as private organizations [21] [38] [39] [40]. The collaboration between university management and various research as well as education supplier has significant effect on the relationship of supplier and SCM.

Both these suppliers, education and research has significant positive relationship with SCM in educational institutions [21] [41] [42] [43] [44]. Different suppliers such as high school/college, suppliers of the faculty including other universities, self-funding students and family such as parents enhance the positive effect of SCM. Majorly, the university management is the key to introduce various suppliers.

As the supply chain requires the supply of various ingredients to fulfil input requirements, therefore, in educational institutions of Indonesia, education and research supplier has key role to enhance SCM in universities. Distribution channels are also most important [22] to distribute various services related to SCM.

Thus, from above discussion, it is evident that education supplier and research

suppliers has significant relationship with SCM. Increase or decrease in supplier and research suppliers has significant effect on SCM practices. However, in this whole process, university management is major role to play. Therefore, it is hypothesized that;

H₁: There is a significant relationship between education supplier and SCM.

H₂: There is significant relationship between research supplier and SCM.

H₃: There is a significant relationship between education supplier and university management.

H₄: There is a significant relationship between research supplier and university management.

Students are the major supplier of supply chain activities. However, proper leadership [23] is most important to generate output from students. In this direction, university management influence the supplier with their policies. Primarily, research also forms a connection between the university management as well as industry and it develop a platform for collaboration [24] [25] [26] [45].

It recognized the student as the university's fundamental customer as well as Industry and businesses [16] in which university provides the platform to develop something new. Thus, the university management has the major influence between the relationship of various suppliers such as education suppliers and

research suppliers. Therefore, it is hypothesized that;

H₅: University management mediates the relationship between education supplier and SCM.

H₆: University management mediates the relationship between research supplier and SCM.

Nevertheless, partnerships between the public and private sectors to accomplish public functions are available at every stage of government [27]. Policies of public influence the relationship of university management and SCM practices. It has the significant impact on SCM in manufacturing as well as services industries.

Over the last few years, private-sector financing through public-private partnerships has become gradually common worldwide as a way of procuring as well as maintaining public-sector infrastructure, in sectors such as transportation [28], particularly in supply chain sector. Sometimes hard public policies effect negatively on SCM in different supply chain activities. On the other hand, good policies from public has significant positive effect on university management and SCM.

Public and private partnership establish a good infrastructure in various activities which effect on their long-term goals [29], particularly in supply chain activities in academic institutions. Within Indonesian universities, public policies for private partnership is most crucial to enhance the SCM. Public policies influence on the relationship of various external supplier to the university. Different rules and regulations always have significant effect on the relationship of any two parties in an open platform.

In theory, public policies for private partnerships in several policy sectors are likely to create synergistic dynamics that draw on the

strengths as well as weaknesses of each partner [30]. It is one of the most influencing factor of any partnership. In educational sector, these policies effect on the relationship of university and supply chain companies. These policies effect indirectly on education suppliers and research suppliers. Effect on education suppliers and research suppliers always have significant influence on SCM through university management. Thus, from above discussion, it is concluded that public policy for private partnership has significant influence on the relationship of universities and SCM. Hence, it is hypothesized that;

H₇: Public policy of private partnership moderates the relationship between university management and SCM.

3. Research Methodology

The current study preferred the cross-sectional research design. Quantitative research approach was adopted by considering the nature and objective of the study [31] [32]. Primary data were collected from university employees those involved in SCM process.

The sample size was selected based on [33] series for inferential statistics. According to this series, "sample having less than 50 participants will observe to be a weaker sample; a sample of 100 sizes will be weak; 200 will be adequate; a sample of 300 will be considered as good; 500 very good whereas 1000 will be excellent." Therefore, 300 sample size was selected in this study.

Moreover, the data were collected based on area cluster sampling technique. Selection of this technique is based on the maximum area coverage. As this is one of the suitable technique when the population is spread on a wide area. This study covered the whole Indonesian higher educational institutions; therefore, population is spread on a wide area.

The 5-point Likert scale was used to collect the data. Questionnaires were

distributed by self-visit to the educational institutes. Total 300 questionnaires were distributed in which 223 were returned. From 223 questionnaires, 13 were missing with significant part of questionnaire. Therefore, total 210 responses were entered and analysed through Smart PLS 3.

4. Data Analysis and Results

4.1 Structural Model Assessment

PLS SEM is one of the prominent technique to analyse the primary data. In the current study PLS 3 was used to finalize the result. First of all, the measurement model assessment was performed to check the

convergent and discriminant validity. The convergent validity was examined through internal item consistency and average variance extracted (AVE). According to [34] to attain the convergent validity, average extracted variance (AVE) should be more than 0.5 for all constructs. On the other hand, factor loading should be more than 0.5.

The analysis of the current study revealed that all the constructs have average variance extracted (AVE) is more than 0.5 and all the items also have factor loading more than 0.5. It shows that convergent validity is achieved. All the results of measurement model are shown in below Table 1.

Table 1. Convergent and Discriminant Validity

Construct	Indicators	Loadings	Composite Reliability	AVE
Education Supplier (ES)	ES1	.721	0.755	0.500
	ES2	.820		
	ES3	.802		
	ES4	.625		
	ES5	.703		
	ES6	.799		
Research supplier (RS)	RS1	.699	0.700	0.523
	RS2	.630		
	RS3	.821		
	RS4	.866		
	RS5	.655		
University Management (UNI)	UNI1	.725	0.822	0.582
	UNI2	.685		
	UNI3	.752		
	UNI4	.862		
	UNI5	.661		
Private partnership policy (PPP)	PPP1	.621	0.856	0.513
	PPP2	.892		
	PPP3	.620		
	PPP4	.720		
	PPP5	.820		
Supply chain management (SCM)	SCM1	.745	0.721	0.545
	SCM2	.756		
	SCM3	.799		
	SCM4	.820		
	SCM5	.621		

Table 2. Discriminant Validity

	1	2	3	4	5	6
ES	0.748					
RS	0.631	0.898				
UNI	0.578	0.630	0.701			
PPP	0.407	0.788	0.635	0.808		
SCM	0.611	0.794	0.690	0.764	0.708	

4.2 Structural Model Assessment

Assessment of structural model was performed through PLS bootstrapping technique. While analysing the data, 1.96 minimum level of t-value was examined to accept or reject the hypothesis developed in

the second chapter of this study. The direct results of hypothesis are shown in Table 3. According to the direct results it is shown that all hypothesis has t-value more than 1.96. Therefore, it accepts the all direct hypothesis.

Table 3. Direct Effect

Hypot heses	Relationship	(β)	SD	T-value	P-Values	Decision
H₁	ES -> SCM	0.107	0.015	7.100	0.000	Supported
H₂	RS -> SCM	0.307	0.033	9.299	0.000	Supported
H₃	ES -> UNI	0.247	0.110	2.241	0.025	Supported
H₄	RS -> UNI	0.379	0.168	2.249	0.024	Supported
H₅	UNI -> SCM	0.280	0.113	2.469	0.022	Supported

Table shows the indirect effect of university management between education supplier and SCM, research supplier and SCM. The results of the indirect effect show that for

both mediation hypothesis, the t-value is above 1.96 and p-value is below 0.05 which accept both mediation hypothesis. Results are shown in Table 4.

Table 4. In-Direct Effect through Mediation

Hypot heses	Relationship	(β)	SD	T-value	P-Values	Decision
H₆	ES -> UNI ->SCM	0.190	0.011	4.619	0.000	Supported
H₇	RS -> UNI ->SCM	0.107	0.015	7.123	0.000	Supported

Moreover, the moderation effect is shown in Table 5. The moderation results indicate that public policy of private partnership has

significant role in SCM. As the t-value for moderation effect is above 1.96.

Table 5. In-Direct Effect through Mediation

Hypot heses	Relationship	(β)	SD	T-value	P-Values	Decision
H₈	UNI*PPP ->SCM	0.290	0.051	5.696	0.000	Supported

5. Research Findings and Discussion

Results of the present study shows that education suppliers and research suppliers have significant role in SCM in Indonesian educational institutions. The analysis revealed that the education suppliers and research suppliers have significant positive relationship with SCM. Increase in education suppliers and research suppliers increase the SCM. Thus, education suppliers and research suppliers are the major drivers of SCM in Indonesian educational institutions. However, decrease in these two major drivers will decrease the overall performance of SCM.

Moreover, the role of universities management has most crucial. The results of the study found that universities management has mediating role between

above major drives and SCM. University management as a mediating variable enhances the positive effect of education suppliers and research supplier on SCM.

More importantly the role of public policy of private partnership is most crucial in

SCM. In the current study public policy of private partnership is taken as moderating variable. The results of the study show that positive public policy of private partnership has significant influence on the relationship of university management and SCM. Figure 4 shows that public policy of private partnership strengthen the positive relationship of university management and SCM.

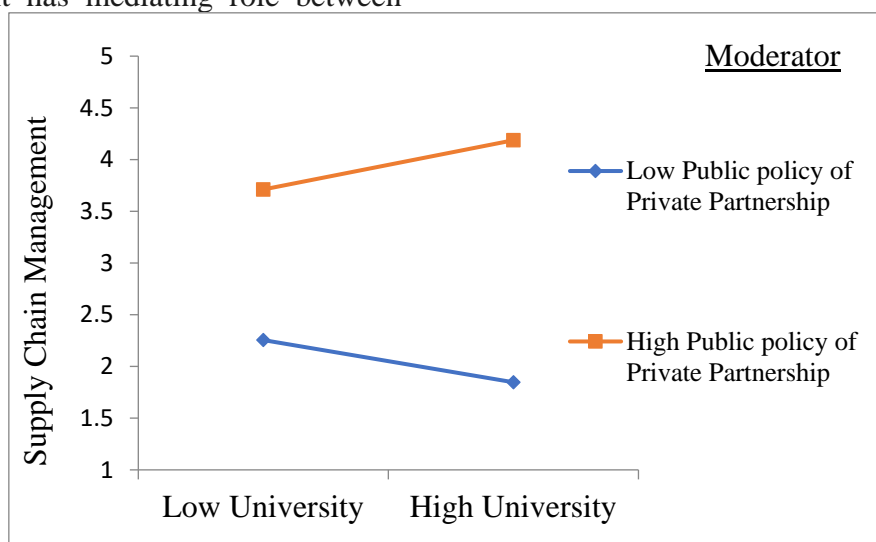


Figure 4. Moderation effect of university management
Source: Author's own estimations based on results

By sum up, the findings of the study revealed that external as well as internal suppliers are the major determinants of SCM in Indonesian universities. These factors are the roots of SCM practices. Moreover, university management has meditating role between various suppliers and SCM. Additionally, public policy for private partnership has moderating role between universities and SCM.

6. Conclusion

This study based on the SCM practices in educational institutions of Indonesia. Data were collected from the employees of educational institutions. Majorly this study examined the effect of education supplier and research supplier on SCM. Moreover, the mediating role of university and moderating role of public policy of private partnership was examined.

It is found that education supplier and research supplier are key to success in SCM

among educational institutions of Indonesia. Moreover, the university management has major role to enhance the positive effect of education supplier and research supplier on SCM. Additionally, the public policy of private partnership has influence on SCM. Good public policy of private partnership has important to boost up SCM practices. However, weak public policy of private partnership may affect negatively. Hence, the current study found that education supplier, research supplier, university management and public policy of private partnership are the vital drivers of SCM in Indonesian educational Institutions.

It is recommended for the Indonesian universities to enhance SCM activities by enhancing various suppliers such as education suppliers and research suppliers. Indonesian universities should collaborate with different providers of education and different research provides such as various project initiators. Moreover, these institutions should develop good management which collaborate with external partners to enhance SCM practices.

The future researchers are invited to the expand the model of current study by incorporating other factors such as such as service quality, transit time, information communication technology (ICT) and e-payment methods. All these factors have significant influence on supply chain activities.

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